

Use on all contracts with ancillary concrete. Ancillary concrete is defined as cast-in-place concrete placed under bid items in standard spec 390, 501, 509, 510, 601, 602, 603, 604, 611, 620, 636, and 654; and concrete placed under the following bid items in standard spec 416 and 504:

416.0060	Concrete Pavement Widening
416.0065	Concrete Pavement Widening HES
416.0160 - 0199	Concrete Driveway (Inch)
416.0260 - 0299	Concrete Driveway HES (Inch)
416.0505	Pavement Terminal Units
416.0710	Concrete Pavement Repair
416.0715	Concrete Pavement Repair SHES
416.1010	Concrete Surface Drains
416.1015	Concrete Surface Drains HES
504.0900	Concrete Masonry Endwalls

501-065

QMP Concrete Ancillary.

A Description

A.1 General

- (1) Conform to standard spec 390, 416, 501, 504, 509, 510, 601, 602, 603, 604, 611, 620, 636, and 654 as modified in this special provision. Apply this special provision to all concrete cast in place under these designated sections, except for sections 416 and 504. For sections 416 and 504, apply only to concrete placed under the following bid items:

416.0060	Concrete Pavement Widening
416.0065	Concrete Pavement Widening HES
416.0160 - 0199	Concrete Driveway (inch)
416.0260 - 0299	Concrete Driveway HES (inch)
416.0505	Pavement Terminal Units
416.0710	Concrete Pavement Repair
416.0715	Concrete Pavement Repair SHES
416.1010	Concrete Surface Drains
416.1015	Concrete Surface Drains HES
504.0900	Concrete Masonry Endwalls

- (2) Provide and maintain a quality control program, defined as all activities and documentation of the following:
 1. Mix design.
 2. Production control, placement control, and inspection.
 3. Sampling, testing, measurement, and correction of materials and in-place concrete.
- (3) The contractor may include ancillary concrete in a quality control program required for concrete pavement or structural concrete.
- (4) Chapter 4 of the department's construction and materials manual (CMM) provides additional detailed guidance for QMP work and describes required sampling and testing procedures. The contractor may obtain the CMM from the department's web site at:

<http://roadwaystandards.dot.wi.gov/standards/cmm/index.htm>

A.2 Concrete Plant Certification

- (1) Apply subsection A.2 to items under this special provision from standard spec 504, 510, 604, 611, and 654.
- (2) For concrete produced at a ready mixed concrete plant, provide the engineer with a copy of the plant's current certification given by the National Ready Mixed Concrete Association. Submit concrete mix documentation as specified under this special provision.
- (3) The contractor may utilize a portable batching plant producing a department-approved QMP mix as specified in B.4.1(1). Submit concrete mix documentation as specified under this special provision.
- (4) If either of the above requirements are met, QC testing of the mix and mix aggregates is not required for the items listed within A.2(1). The department may perform verification testing, as directed by the engineer.
- (5) If the above requirements are not met, perform QC testing as specified in B.6. Submit concrete mix documentation as specified under this special provision.

B Materials

B.1 Personnel

- (1) Perform the material sampling, testing, and documentation required under this provision using HTCP certified technicians. Have a PCC technician certified under HTCP at level I present at the project site, prepared and equipped to perform required sampling and testing, whenever placing concrete. Provide an organizational chart to the engineer including names, telephone numbers, and current certifications of all personnel involved in the quality control program.

B.2 Laboratory Requirements

- (1) Perform the cylinder compressive strength testing at a department-qualified laboratory. Obtain information on the Wisconsin laboratory qualification program from:
 Materials Management Section
 3502 Kinsman Blvd.
 Madison Wisconsin 53704
 Telephone: 608-246-5388
<http://www.dot.state.wi.us/business/engrserv/lab-qualification.htm>

B.3 Equipment

- (1) Furnish the necessary equipment and supplies for performing quality control testing. The engineer may inspect the measuring and testing devices to confirm both calibration and condition. Calibrate all testing equipment according to CMM 4-15-12 and maintain a calibration record at a location satisfactory to the engineer.

B.4 Concrete Mixes

B.4.1 Initial Mix

- (1) Determine concrete mixes for the project. Use concrete mixes from standard spec 501. Alternatively, where one of the grade A mixes is allowed under standard spec 501.3.1.3, the contractor may use a QMP mix design approved for concrete pavement or structural concrete under this contract.
- (2) At least 3 business days before producing concrete, submit concrete mix documentation to the engineer for approval. Provide documentation ensuring that all materials conform to standard spec 501.2 unless the engineer waives specific requirements. Include documentation for mix designs as follows:
 1. Mix grade designation for standard specification mixes.
 2. Materials: type, brand, and source.
 3. Aggregates: absorption, specific gravities, wear, soundness, freeze thaw test results if required, air correction factor, and proposed gradation control limits.

B.4.2 Mix Changes

- (1) Prepare and submit modifications to a standard specification concrete mix or a contractor concrete mix design to the engineer for approval before using that modified mix. Modifications requiring the engineer's approval include changes in:
 1. The source of any material.
 2. The amounts of cementitious materials.
 3. The adjustment of fine to total aggregate greater than ± 3 percent by weight.
 4. The addition or deletion of admixtures.

B.5 Quality Control Documentation

- (1) Document all observations, inspection records, mix adjustments, cylinder identification, and test results daily according to CMM 4-15-42. Submit a copy of the ancillary concrete daily test report to the engineer each day. Submit original testing records to the engineer in a neat and orderly manner within 10 days after completing concrete production.

B.6 Contractor Testing

B.6.1 General

- (1) Perform all quality control tests necessary to control the production and construction processes applicable to items under this special provision from standard spec 390, 416, 509, 601, 602, 603, 620, and 636. Use the test methods identified below, or other methods the engineer approves, to perform the following tests:

Aggregate gradationsAASHTO T 11^[1] and T 27^[1]
 Air content AASHTO T 152^[2]
 Slump AASHTO T 119^[2]
 Temperature AASHTO T 309
 Compressive strength..... AASHTO T 22, T 23, and T 141

^[1] As modified in CMM 4-25-50.

^[2] As modified in CMM 4-25-70.

- (2) The department may periodically observe contractor sampling and testing, and direct additional contractor sampling and testing for department evaluation. Ensure that all test results are available for the engineer's review at any time during normal working hours.
- (3) Randomly select sample locations using the procedures described CMM 4-15-12. Perform random QC testing at the following frequencies:
 1. Test air content and slump a minimum of once per 100 cubic yards for each mix grade and placement method.
 2. Cast one set of 2 cylinders per 200 cubic yards for each mix grade and placement method. Cast a minimum of one set of 2 cylinders per contract for each mix grade and placement method.
 3. For deck overlays, perform tests and cast cylinders once per 50 cubic yards of grade E concrete placed.

B.6.2 Compressive Strength

B.6.2.1 Concrete Sampling

- (1) Have an HTCP certified PCC technician I sample, test, and document results during concrete production and placement. Cast all cylinders in a set from the same sample. Sample according to AASHTO T 141. Cast and standard cure the cylinders according to AASHTO T 23.

B.6.2.2 Concrete Cylinder Curing

- (1) Provide facilities for initial curing. For up to 48 hours after casting, maintain the temperature adjacent to the specimens in the range of 60 to 80 degrees F (16 to 27 degrees C) and prevent moisture loss. Between 24 and 48 hours after casting, transport the specimens to a department-qualified laboratory for standard curing according to AASHTO M201 for 28 days.

B.6.2.3 Compressive Strength Testing

- (1) Have an HTCP certified compressive strength tester, in a department-qualified laboratory, perform compressive strength testing and document the results. Determine the 28-day compressive strength in pounds per square inch of each cylinder according to AASHTO T 22. Test each cylinder to failure. Use a compression machine that automatically records the date, time, rate of loading, and maximum load of each cylinder. Include a printout of this information with the compressive strength documentation for each cylinder tested.

B.6.3 Air Content

- (1) On each day of production, test the concrete air content as early and as frequently as practicable until the concrete meets the specifications and the production process is under control.
- (2) Have an HTCP certified PCC technician I test air content according to AASHTO T 152, as modified by the department. The lower and upper specification limits for air content are the values specified in standard spec 501.3.2.4.2. Document admixture dosage rates,

time of day, and air temperature on the ancillary concrete daily test report whenever changing an admixture dosage rate.

- (3) Double the air content test frequency if an individual air test falls outside the following warning bands:
 - 1. For deck overlay grade E concrete: less than 5.5% or greater than 6.5%.
 - 2. For slip-formed concrete: less than 6%.
 - 3. For all other concrete: less than 5%.

Continue testing at increased frequency until an individual test point is back within the warning band.

- (4) If an individual air test is outside the specification limits, notify the engineer, and perform additional air tests as often as practicable on subsequent loads until the air content is inside the specification limits. The material is nonconforming when an individual test result exceeds the specification limit. Material from the load with the first test exceeding the specification limit, continuing to but not including the load with the first subsequent test within the specification limits, is nonconforming. The department may direct removal and replacement or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

B.6.4 Concrete Temperature

- (1) Have an HTCP certified PCC technician I measure concrete temperature according to AASHTO T 309. Test concrete taken from the same sample used for air content testing. Record concrete temperatures on the air content control chart.

B.6.5 Slump

- (1) Have an HTCP certified PCC technician I measure slump according to AASHTO T 119. The contractor need not test slump for concrete placed by slip-form methods unless the engineer requests. For other placement methods, test slump whenever an air content test is performed or cylinders are made and as the engineer directs. Provide material conforming to the slumps specified in standard spec 501.3.7.1.

B.6.6 Aggregate Gradations

- (1) Have an HTCP certified aggregate technician IPP perform aggregate gradation tests according to AASHTO T 11 and T 27.
- (2) The engineer may accept aggregate gradation based upon satisfactory records of previous testing of the material at the time of aggregate production. Otherwise, test aggregate gradations at the frequency listed below which results in the least number of tests.
 - 1. A maximum of one test per day.
 - 2. A minimum of one test per 400 cubic yards of cumulative concrete placed.

B.7 Department Testing

B.7.1 Verification Testing

- (1) The department will have an appropriately HTCP certified technician perform verification testing. The department will sample randomly at locations independent of the

contractor's QC work. In all cases, the department will conduct the verification tests with separate personnel and equipment from the contractor's QC tests. The department will perform verification testing at a frequency of 10 percent of the random concrete quality control tests or a minimum of once per project, or at greater frequency if determined to be necessary by the engineer. Department verification testing is optional for aggregate used in the concrete.

- (2) If verification tests indicate conformance with specifications, no further action is required. If verification tests indicate nonconformance with specifications, the engineer and contractor will jointly investigate any testing discrepancies. The investigation may include additional testing as well as review and observation of both the department's and contractor's sampling and testing procedures and equipment. Both parties will document all investigative work.
- (3) Correct all deficiencies. If the contractor does not respond to an engineer request to correct a deficiency or resolve a testing discrepancy, the engineer may suspend production until action is taken. Resolve disputes as specified in B.8.

B.7.2 Independent Assurance Testing

- (1) Independent assurance is unbiased testing the department performs to evaluate the department's verification and the contractor's QC sampling and testing including personnel qualifications, procedures, and equipment. The department will perform the independent assurance review according to the department's independent assurance program.
- (2) If the department identifies a deficiency, and after further investigation confirms it, correct that deficiency. If the contractor does not correct or fails to cooperate in resolving identified deficiencies, the engineer may suspend production until action is taken. Resolve disputes as specified in B.8.

B.8 Dispute Resolution

- (1) The engineer and contractor should make every effort to avoid conflict. If a dispute between some aspect of the contractor's and the engineer's testing program does occur, seek a solution mutually agreeable to the project personnel. The department and contractor may review the data, examine data reduction and analysis methods, evaluate sampling and testing procedures, and perform additional testing. Use ASTM E 178 to evaluate potential statistically outlying data.
- (2) If the project personnel can not resolve a dispute and the dispute affects payment or could result in incorporating nonconforming product, the department will use third party testing to resolve the dispute. The department's central office laboratory, or a mutually agreed on independent testing laboratory, will provide this testing. The engineer and contractor will abide by the results of the third party tests. The party in error will pay service charges incurred for testing by an independent laboratory. The department may use third party test results to evaluate the quality of questionable materials and determine the appropriate

payment. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

B.9 Acceptance

- (1) The department will accept concrete based on the contractor QC tests unless it is shown through the verification, or the dispute resolution process that the contractor's test results are in error.

C (Vacant)**D (Vacant)****E Payment**

- (1) Costs for all sampling, testing, and documentation required under this special provision are incidental to the work. If the contractor fails to perform the work required under this special provision, the department may reduce the contractor's pay. The department will administer pay reduction under the Non-performance of QMP administrative item.

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